

***1541 EXPRESS***

**RICHVALE**

**TELECOMMUNICATIONS LIMITED**

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# **1541 EXPRESS**

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**Speed Cartridge For The 1541 Single Disk Drive**

**Designed by Philip Willow  
and David Foster**

**Manual by Marc Swanson**

**Copyright Richvale Telecommunications  
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April 8, 1984**

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## 1. Installation

Before you install the 1541 Express cartridge, turn the computer off. Then open the computer up by removing the 3 screws holding the cover on. The two wires hanging from the side of the cartridge must be connected to chips inside the Commodore 64.

**NOTE:** Opening your computer or your drive to install the 1541 Express could void your equipment warranty. You may want to contact your dealer for installation.

The wires are marked with the names of the chips they should be connected to. If you connect them wrongly or to the wrong chips, the 1541 Express cartridge will not work. Both wires have a clip at one end. Inside this clip is a small hook that will emerge when you press the plunger down.

- 1) Use this hook to connect the clip marked "6510" to the 6510 chip. This is the large 40-pin chip which you will find marked "6510". On this chip, locate pin "28", the 8th pin up from the bottom on the right side of the chip. Clip the hook around this pin.
- 2) The hook at the end of the other wire goes to the chip labelled "U14". The characters "U14" appear in the actual board, not on the chip itself. Commodore has released several versions of the 64's main board and the "U14" chip may be in different places on different computers. (This chip should also be labelled "74LS258".) Connect the second clip to pin 15, second pin from the top on the right side.
- 3) Make sure the hooks are touching only the correct pins. Then put the computer back together and insert the 1541 cartridge onto the 64's cartridge port with the label side up.
- 4) Turn the computer on and the second line of the power-up message on the 64's screen will display the words, "WITH 1541 EXPRESS".

If you have any equipment other than one single drive connected to your 64, see the "Configuration" section on these sheets before you connect that equipment with the Express cartridge in place.

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## 2. Operation

- 1) When you turn the computer on with the cartridge and wires connected, the "Fast" operating mode is on. Any disk commands you enter will be executed 2 to 3 times faster than normal.
- 2) To turn the "Fast" mode off and use the normal or "Slow" mode of the disk drive, hold down <CTRL> and press <f 3>. The screen border will flash black or dark blue once fairly quickly.
- 3) To return to Fast mode, hold down <CTRL> and press <f 1>. The screen border will flash white or light blue once, a little slower this time.
- 4) You may toggle between Slow and Fast modes at almost any time, even from within a program. Do not try to change modes while the drive is reading or writing to the disk (while the drive activity light is on). In some cases, this would cause a crash.
- 5) When you hold down <SHIFT> and press the <RUN/STOP> key, the computer will load the first program on the disk in the drive. These keystrokes are the equivalent of typing in: **LOAD"0:"**,8.
- 6) The Express cartridge sends LOAD and SAVE commands to Unit 8, the disk drive, in both Fast and Slow modes. For example, if you enter **LOAD"FILE"**, the cartridge will read that command as if you had typed, **LOAD"FILE",8**.
- 7) With the cartridge in Fast mode, you will be able to access the drive even when you have sprites on the screen. Normally, this is impossible on the Commodore 64.

## 3. Software

The 1541 Express cartridge is transparent to most commercial software. You will be able to run most programs with the cartridge in and Fast mode turned on. Because the Express cartridge is transparent, the program you run will not "see" anything different about the way the drive is accessed, even in Fast mode.

Some programs, such as games, use the serial bus in unusual ways. You will be able to load some programs using Fast mode, but have to put the cartridge in Slow mode to use them. To load other programs, you will have to switch the cartridge to Slow mode. But once they are loaded, you will be able to operate them in Fast mode.



With some programs, you will be able both to load and run most of the program using Fast mode. But you may have to use certain program options in Slow mode. For example, in the "MultiPlan" program, you will have to switch the cartridge into Slow mode before you save, but you can return to Fast mode after you have finished saving.

If you have any difficulty loading or running any programs, put the cartridge into Slow mode, either before loading the program, or before you run it. When you put the cartridge in Slow mode, it returns operation to standard drive use.

If you find a program that you simply cannot run in Slow or Fast mode, pull the cartridge out of the cartridge port (but leave the wires attached to their chips). You will have to do this with cartridge programs for example.

#### 4. Disk Files

The 1541 Express cartridge reserves one of the drive buffers. This reduces the number of files you can have OPEN to the disk at any one time from Fast mode. Normally, you can have 3 sequential files, or 1 sequential and relative file OPEN to the drive at the same time. With the Express in Fast mode, you will be able to have only 2 sequential files, or 1 relative file OPEN.

To create a relative file, the drive requires 3 buffers. If you are creating a relative file, you must put the cartridge in Slow mode. To access a relative file, the cartridge can be in Fast mode.

Note that some programs, usually data bases, require all the drive buffers in order to operate. If you put the cartridge in Slow mode, it will free the extra buffer and allow you to run such programs.

#### 5. Configuration

With the Express cartridge turned to Fast mode, you will be able to connect an RS-232 modem through the user port and use both the cartridge and the modem at the same time. This allows you to upload and download directly to disk. You may also have an RS-232 printer connected and working at the same time.

However, if you have more than one disk drive connected to your



computer, or a drive and a printer, you will have to make a few adjustments to work with the 1541 Express cartridge. Normally, while using the 1541 Express in Fast mode, only one device can be connected to the 64's serial port.

### Extra Drives

With two drives connected to your computer, you will have to turn one of them off or disconnect it to make the connected drive operate in Fast mode. To address both drives, put the cartridge in Slow mode (<CTRL> and <f 3>), then turn the other drive on or reconnect it and use both drives in Slow mode.

### Printers

With a serial printer, such as the MPS 801 or Commodore Graphics Printer Model 1525, you will have to disconnect the printer or turn it off while the Express is in Fast mode. When you want to print, through a word processor for example, put the cartridge into Slow mode (<CTRL> and <f 3>). Then connect the printer or turn it on and start the output. To return to using Fast mode, disconnect the printer, then turn Fast mode on (<CTRL> and <f 1>).

Parallel printers work differently depending on how you have interfaced them to the computer. With a parallel printer connected through the user port (for example, using RTC's VL-3 cable), you will have no problem. You can leave the printer on and connected, and leave the cartridge in Fast mode.

However, with a parallel printer connected serially (for example, using the CARD? parallel printer interface), you will have to disconnect the serial plug from the computer while in Fast mode. It is not enough to turn the printer off. When you want to print, toggle the Express cartridge into Slow mode first. Then reconnect the printer and print. To return to using Fast mode after your printout, disconnect the printer, then turn Fast mode on (<CTRL> and <f 1>).

### RTC Fast Cable

The RTC Fast Cable will allow you to connect any printer to your system, turn it on and still use Fast mode with your drive. Any disk commands you enter will be executed 3 to 5 times as quickly as normal.

NOTE: The Fast cable connects the user port to a chip inside the drive. Installation details are included with the Fast cable.

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## 6. Programmer's Notes

This section describes the registers and subroutines affected by the 1541 Express cartridge.

**1) Purpose:** Determines whether Express cartridge is present or not

Call address: \$FFF3

Registers Affected: X, Y

Description:

This subroutine sets the Z flag if the 1541 cartridge is present. Check this address first; the following subroutines will crash if you have not determined whether the Express cartridge is present.

Example:

```
JSR    $FFF3
BNE    NOEXPR
; 1541 EXPRESS IS PRESENT
NOEXPR (continue)
```

**2) Purpose:** To determine the mode (Fast or Slow) of the Express cartridge and whether a Fast cable is present or not

Call Address: \$EC00

Registers Affected: A

Description:

Return the current mode in the Accumulator as follows: Bit 7 - "0" if Slow, "1" if Fast; Bit 0 - "0" if Fast cable not present, "1" if it is.

Example:

```
JSR    $EC00
ASL    A ; CHECK BIT 7
BCS    FAST
;      IN SLOW MODE
FAST ; IN FAST MODE
```



3) Purpose: To put cartridge in Slow or Fast mode

Call Address: \$EC03

Registers Affected: A, X, Y

Description:

Set the current mode according to the Accumulator. The Accumulator must be prepared as follows: Bit 7 - "0" enables Slow mode, "1" enables Fast mode.

Example:

```
LDA #$80 ; ENABLE FAST MODE
JSR $EC03
```

or

```
LDA #$00 ; ENABLE SLOW MODE
JSR $EC03
```

or

```
JSR $EC00
PHA      ; SAVE CURRENT MODE
LDA #$00 ; ENABLE SLOW MODE
JSR $EC03
.
.
.
PLA
JSR $EC03 ; RESTORE OLD MODE
```

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**4) Purpose:** Read status of function keys

**Call Address:** \$EC06

**Registers Affected:** A

**Description:**

<CTRL> and <f 1> or <f 3> toggles between the Fast and Slow modes of the cartridge. This subroutine returns the current status of the function keys in the Accumulator. The Accumulator is set as follows: Bit 7 - "0" means the function keys are enabled, "1" means they are disabled.

**Example:**

```
JSR    $EC06
ASL A ; CHECK BIT 7
BCS    NOKEYS
      ; FUNCTION KEYS ENABLED
NOKEYS ; FUNCTION KEYS DISABLED
```

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**5) Purpose:** Enable/Disable function keys used with Express cartridge

**Call Address:** \$EC09

**Registers Affected:** A

**Description:**

This subroutine enables or disables the <CTRL> + <f 1> or <f 3> feature of the Express cartridge according to the value in the Accumulator. The Accumulator must be prepared as follows: Bit 7 - "1" means the function keys are enabled, "0" means they are disabled.

```
LDA    #$80 ; DISABLE FUNCTION KEYS
JSR    $EC09
```

or

```
LDA    #$00 ; ENABLE FUNCTION KEYS
JSR    $EC09
```

or

```
JSR    $EC06
PHA    ; SAVE FUNCTION KEY STATUS
LDA    #$80
JSR    $EC09 ; DISABLE FUNCTION KEYS
.
.
PLA
JSR    $EC09 ; RESTORE OLD FUNCTION KEY STATUS
```



# RTC FAST CABLE

## FOR USE WITH 1541 EXPRESS

The 1541 Express cartridge accelerates the 1541 drive to 2 or 3 times its normal operation speed. With the addition of the RTC Fast Cable, any disk commands you enter will be executed 3 to 5 times as quickly as normal. The RTC Fast Cable will also allow you to connect any printer to your system, turn it on and still use Fast mode with your drive.

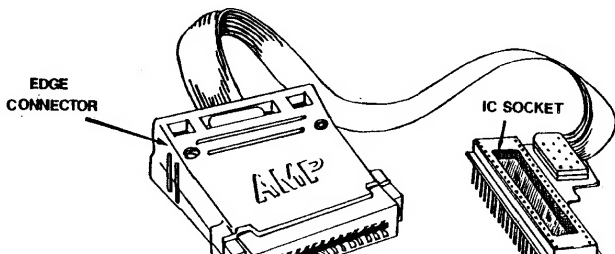
### Installation:

Before you install the RTC Fast Cable, turn off the 1541 Disk Drive and C64 computer. Then open the disk drive up by removing the four screws from the bottom of the disk drive and lift the top cover from the disk drive.

**Note:** Opening your disk drive to install the RTC Fast Cable could void your equipment warranty. You may want to contact your dealer for installation. Richvale Telecommunications will not be held liable for any damages arising from use or installation of the RTC Fast Cable.

Take note of the position of the 6522 chip. Remove the 6522 chip (see Diagram 2A & 2B for position of the chip), plug in the IC Socket (see Diagram 1) where you removed the 6522 chip. Make sure that the IC socket is positioned so that the extension of the IC Socket is to the right when looking at the open disk drive from the front. Plug the 6522 chip into the IC Socket so that the 6522 chip is in the same position as it was before it was removed. Plug the Edge Connector (see Diagram 1) into the user's port of the C64 Computer. Replace the disk drive cover and replace the screws.

### RTC FAST CABLE





**Continus**



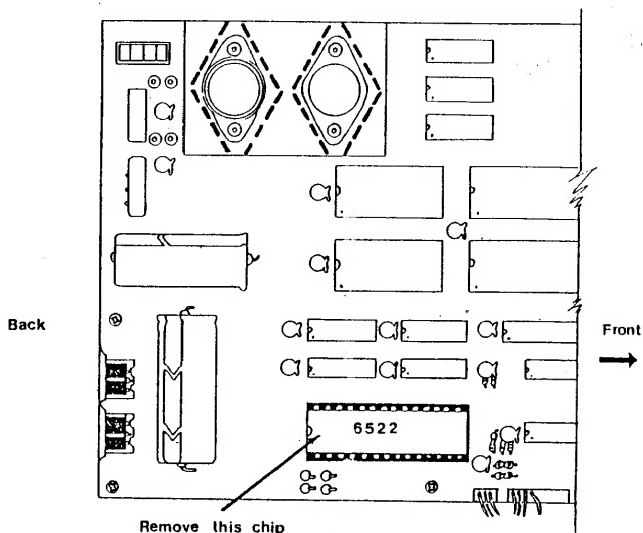
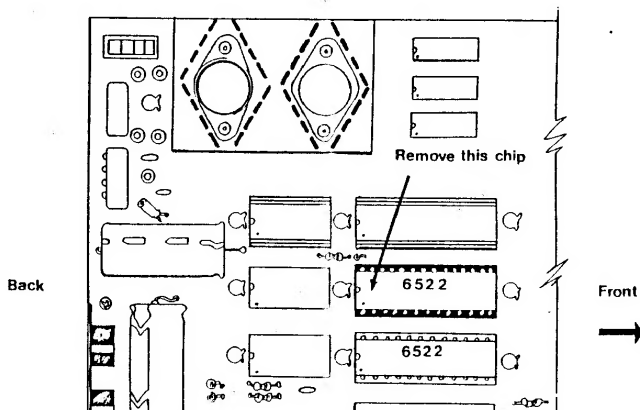


Diagram 2a : 1541 circuit board : Revision A



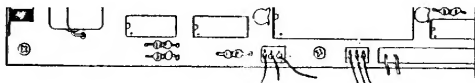


Diagram 2 b: 1541 circuit board : Revision B/C

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